AL.2.2010-105

University of Alberta Library
0 1620 3415531 5

*nd teacher: Use this cover sheet for mailing or faxing.*

**ASSIGNMENT BOOKLET**
SCN2242 Chemistry 20
Module 4 Assignment

| FOR STUDENT USE ONLY | |
|---|---|
| Date Assignment Submitted:<br>_____<br>Time Spent on Assignment:<br>_____ | (If label is missing or incorrect)<br>Student File Number:<br>_____<br>Module Number: _____ |

**FOR OFFICE USE ONLY**

Assigned Teacher: _____

Assignment Grading: _____

Graded by: _____

Date Assignment Received:

**Student's Questions and Comments**

**Apply Module Label Here**

**Name**
**Address**
**Postal Code**

*Please verify that preprinted label is for correct course and module.*

**Teacher's Comments**

_____
**Teacher**

# INSTRUCTIONS FOR SUBMITTING THIS DISTRIBUTED LEARNING ASSIGNMENT BOOKLET

When you are registered for distributed learning courses, you are expected to regularly submit completed assignments for correction. Try to submit each Assignment Booklet as soon as you complete it. Do not submit more than one Assignment Booklet in one subject at the same time. Before submitting your Assignment Booklet, please check the following:

- Are all the assignments completed? If not, explain why.
- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

## MAILING

1. Do **not** enclose letters with your Assignment Booklets. **Send all letters in a separate envelope.**

2. Put your Assignment Booklet in an envelope and take it to the post office and have it weighed. Attach **sufficient postage** and seal the envelope.

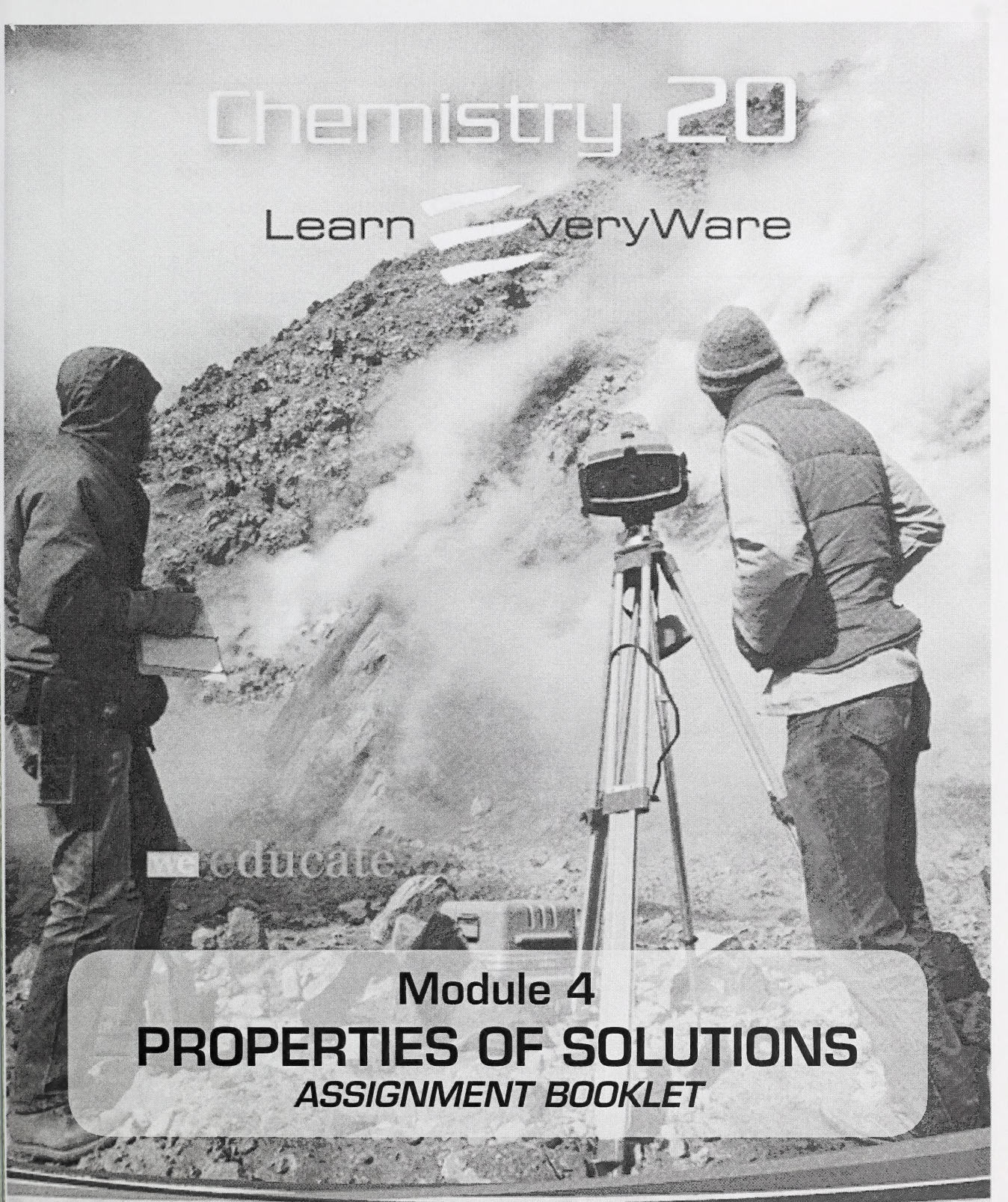
## FAXING

1. Assignment Booklets may be faxed to the school with which you are registered. Contact your teacher for the appropriate fax number.

2. All faxing costs are the responsibility of the sender.

## E-MAILING

It may be possible to e-mail your completed Assignment Booklet to the school with which you are registered. You also may be **required** to e-mail some of your assignments. Contact your teacher for the appropriate e-mail address.




# Module 4
# PROPERTIES OF SOLUTIONS
## *ASSIGNMENT BOOKLET*

## FOR TEACHER'S USE ONLY

### Summary

| | Total Possible Marks | Your Mark |
|---|---|---|
| Lesson 1 Assignment | | |
| Lesson 3 Assignment | | |
| Lesson 5 Assignment | | |
| | | |

### Teacher's Comments

Chemistry 20
Module 4: Properties of Solutions
Assignment Booklet
ISBN 978-0-7741-3003-5

Cover Art: © Photodisc/Getty Images

| This document is intended for | |
|---|---|
| Students | ✓ |
| Teachers | ✓ |
| Administrators | |
| Home Instructors | |
| General Public | |
| Other | |

You may find the following Internet sites useful:

- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**
- Tools4Teachers, **http://www.tools4teachers.ca**

Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Copyright © 2008, Alberta Education. This resource is owned by the Crown in Right of Alberta, as represented by the Minister of Education, Alberta Education, 10155 – 102 Street, Edmonton, Alberta, Canada T5J 4L5. All rights reserved.

This courseware was developed by or for Alberta Education. Third-party content has been identified by a © symbol and/or a credit to the source and must be used as is. This courseware may be reproduced in any form, including photocopying, without the written permission of Alberta Education. Changes can be made only to content owned by Alberta Education. For more detailed information, refer to the Terms of Use Agreement. Every effort has been made to acknowledge the original source and to comply with Canadian copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Education so corrective action can be taken.

**THIS COURSEWARE IS NOT SUBJECT TO THE TERMS OF A LICENCE FROM A COLLECTIVE OR LICENSING BODY, SUCH AS ACCESS COPYRIGHT.**

UNIVERSITY LIBRARY
UNIVERSITY OF ALBERTA

# MODULE 4: LESSON 1 ASSIGNMENT

## Lesson 1 Assignment: Classifying Matter and Solutions

### Part 1: Discussion

1. In your opinion, do you feel bottled water is safer than tap water? Give reasons or examples to back up your opinion.

2. What is your opinion about selling water?

| **Original posting** |
| --- |
| |

| |
|---|
| **Posting from another student** |
| **Posting from another student** |
| **Commentary on your initial response** |
| **Revised response** |

**Part 2: Lab: Frozen Solutions**

Answer the following questions based on the video presentations for this lab investigation.

**Problem**

1. What is the purpose or identified problem of this lab?

**Procedure**

2. Outline the procedure for each part of the lab.

   a. testing the conductivity of solid lithium chloride

   b. testing the conductivity of aqueous lithium chloride

   c. testing the conductivity of frozen lithium chloride

   d. testing the conductivity of molten lithium chloride

**Analysis and Conclusion**

3. Explain the results from each part of the lab.

   a. solid lithium chloride

   b. aqueous lithium chloride

   c. frozen lithium chloride solution

   d. molten lithium chloride

4. Why is it important to use deionized water when making the aqueous solution of lithium chloride?

# MODULE 4: LESSON 3 ASSIGNMENT

## Lesson 3 Assignment: Solubility

### Part 1: Lab: Shower of Lead(II) Iodide

View the video "Shower of Lead(II) Iodide." You may be required to login with a username and password. Contact your teacher for this information.

Answer the following questions based on the video.

**Problem**

1. What is the purpose of this experiment?

**Procedure**

2. Outline the procedure of the lab.

3. Fill in the following table showing the results of the lab.

| Temperature (°C) | Mass of Solute (g) |
|---|---|
| | |
| | |
| | |
| | |

**Analysis and Conclusion**

4. When the Erlenmeyer flask is brought to 100°C and the solid settles, the hot saturated solution is transferred to a test tube. What assumption is being made about the hot saturated solution? Why must the pipette be warm in completing the transfer?

5. Why are the test tubes left to sit for one hour?

6. What trend exists between temperature and amount of residue?

7. Do the crystals form differently based on cooling speed?

8. Does cooling rate affect solubility?

**Part 2**

1. State three contributions Arrhenius made to the understanding of solution chemistry.

2. For each of the following, determine whether the statement is true or false. For those that are false, write a brief sentence indicating the required correction.

   a. HCl(g) is a molecular compound that ionizes to become an acid upon dissolving in water.

   b. Electrolyte solutions can be acidic, neutral, or basic.

   c. Arrhenius's theories are valid for all acids and bases.

   d. Acetic acid is an ionic compound because it ionizes in water to form $H^+(aq)$ and $CH_3COO^-(aq)$.

   e. More energy is required to break bonds than is released when bonds are formed in endothermic reactions.

f. The principal mechanism for sugar dissolving in water is dissociation.

3. Dissolving a substance can be achieved through dissociation, ionization, or dispersion. Which manner of dissolving occurs to each of the following substances?

   a. acetic acid

   b. methanol

   c. copper(II) sulfate

4. A student is doing a lab to determine whether a particular white solid undergoes an endothermic or exothermic dissolving process. Suggest a procedure the student could use to complete the lab.

5. For each of the following, determine whether the statement is true or false. For those that are false, write a brief sentence indicating the required correction.

   a. A saturated solution of NaCl(s) can be filtered to remove the dissolved solute.

   b. Liquids that do not dissolve in water, such as oil, are said to be immiscible with water.

   c. Pressure is a major factor in the solubility of solids, liquids, and gases in water.

d. Calcium sulfate is an insoluble solid written $CaSO_4(s)$. Even though this compound has the state (s), some of it will dissolve in water.

e. Water must be included in a correctly written dissociation equation.

f. Elemental gases are relatively insoluble in water and should be given the state (g).

6. The solubility of oxygen gas is 0.007 g/100 mL at STP conditions. How much oxygen gas is dissolved in the following situations?

   a. 0.007 g of $O_2(g)$ is bubbled in 100 mL of water

   b. 0.008 g of $O_2(g)$ is bubbled in 100 mL of water

   c. 0.050 g of $O_2(g)$ is bubbled in 300 mL of water

7. Complete the dissociation equations for each of the following substances in water. Make sure you balance the equations.

   a. $Ag_2S(s) \rightarrow$

   b. $CH_3OH(l) \rightarrow$

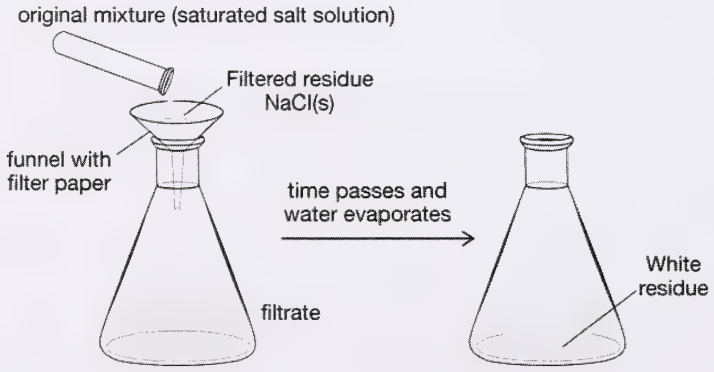
c. $Ba(OH)_2(aq) \rightarrow$

d. $N_2(g) \rightarrow$

8. A cup of coffee has sugar accumulated at the bottom of the cup. Will adding more sugar make the coffee sweeter? Is it possible to make the coffee taste sweeter without adding more sugar?

9. Based on your knowledge of solubility, make a prediction on how global warming will affect ocean life.

10. When a saturated solution of salt is filtered, the residue is collected and removed. The filtrate is allowed to sit and evaporate, and a white residue forms at the bottom of the flask.




Explain the chemical principles behind this observation.

# MODULE 4: LESSON 5 ASSIGNMENT

## Lesson 5 Assignment: Concentration II

**Part 1**

1. A 180-mL disinfectant solution contains 85 mL of isopropyl alcohol. Determine the % V/V concentration of this solution.

2. If 114 g of sucrose is dissolved in water to make a 950-mL solution, determine the % W/V concentration of the solution.

3. A 0.51-kg solution contains 87 mg of potassium iodide. Calculate the % W/W concentration of this solution.

4. 0.30 kg of magnesium sulfate is dissolved in water to make a 92-kg solution. Express the concentration in ppm.

5. Determine the volume of methanol required to prepare 2.4 L of a 38% V/V solution.

6. The following table shows the mercury concentrations in the body tissue of various animals.

| Animal | Mercury Concentration (ppm) |
|---|---|
| plankton | 0.08 |
| fish | 0.23 |
| polar bear | 1.23 |

a. What is the mass of mercury in a 250-g fish?

b. What is the mass of mercury in a 900-kg polar bear?

c. Briefly explain what may be causing the observed trend in mercury concentration in the table.

7. Determine the amount concentration of $2.6 \times 10^{-2}$ g of magnesium chloride dissolved in 45 mL of solution.

8. What mass of ammonium phosphate is present in 1.80 L of a 145-mmol/L solution?

9. What volume is required to make a 0.48-mol/L solution with 24 g of sodium hydroxide?

10. Determine the amount concentration of the iron ions and sulfate ions in a 0.62-mol/L solution of iron(III) sulfate.

11. 18 mL of a 0.055-mol/L sulfuric acid solution is diluted up to 30 mL. What is the new concentration of the acid?

12. What volume of distilled water must be added to 105 mL of 0.600-mol/L sulfuric acid solution in order to dilute it to a concentration of 0.400 mol/L?

13. A concentrated sulfuric acid solution is available in a lab. A 100-mL solution with a concentration of 0.75 mol/L is required. Write out the pre-lab and procedure for making this solution.

**Part 2**

Copy the list of 12 hints on studying the major concepts in Lessons 4 and 5. Include each supporting example.

**Once you have completed all of the questions, submit your work to your teacher.**

© 2008